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ABSTRACT

The Satellite Technology Demonstration (STD), a project of the Federation of Rocky Mountain States, Inc. (FRMS), employed a project management model for its organizational structure. The organization and management system utilized by the STD was designed to accomplish a predetermined set of objectives with the highest quality possible within a federally funded, prenegotiated budget. The management decision-making process was developed to maximize and control available resources in the accomplishment of specific tasks through a process of resource reallocations, task modifications, and intercomponent coordination. Therefore, the STD utilized a decentralized functional structure and modifications of applicable management science approaches including Management by Objectives (MBO) and Systems Theory. The primary subsystems of the management process were the Task Structures and Control and the Budgetary and Financial Control Subsystems. Specific techniques applied when appropriate included variations of the PERT system, linear programing, and general financial control systems. In some cases, it was the first extensive application of such techniques in a large scale social project. (Author/HB)

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SATELLITE TECHNOLOGY DEMONSTRATION

FEDERATION OF ROCKY MOUNTAIN STATES, INC.

technical report

TR 0127

PROJECT ORGANIZATION AND MANAGEMENT - ANALYSIS OF A MODEL

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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INTRODUCTION

The purpose of this report is to review a specific segment of organization and management system design theory in terms of an actual model. The design area to be investigated is for "project" management, and the model to be used is the Satellite Technology Demonstration (STD), a project of the Federation of Rocky Mountain States, Inc. (FRMS).

It is perhaps appropriate to identify the importance for analyzing an effective project organization model. In general, the management of programs or projects has become a critical issue in businesses and government today, particularly when one considers the probable future impact of this device upon management. Many authors have made projections about the organization of the future. Warren Bennis has postulated the following list of developments that will shape future organizations (Bennis, 10-13):

1. Rapid technological change and diversification will lead to interpenetration of the government and legal and economic policies in business. Partnerships between government and business will be typical;
2. The general population will be characterized by increased education and job mobility;
3. People will be more intellectually committed to their jobs and will require more autonomy, involvement, and participation in their jobs;
4. The task of the firm will be more technical, complicated, and unprogrammed; and
5. The organization of the future will be an adaptive, rapidly changing, temporary system, which will be organized around problems to be solved.

This list of organizational characteristics very nearly describes the STD project. It represents an opportunity for review and analysis, not in the sense of an optimal model, but with the intent to recognize characteristics which can effectively enhance the design of similar efforts.

The organization and management system utilized by the STD was designed to accomplish a predetermined set of objectives with the highest quality possible within a federally funded, prenegotiated budget. The management decision-making process was developed to maximize and control available resources in the accomplishment of specific tasks through a process of resource reallocations, task modifications, and intercomponent coordination. As evidenced in relevant organizational research studies and publications, there is no panacea for the design of an organization or management approach to accomplish any given objective. The STD

utilized a decentralized functional structure and modifications of applicable management science approaches including Management by Objectives (MBO) and Systems Theory. The primary subsystems of the management process were the Task Structure and Control and the Budgetary and Financial Control Subsystems. Specific techniques applied when appropriate included variations of the PERT system, linear programming, and general financial control systems. In some cases, it was the first extensive application of such techniques in a large scale social project.

A description of the Task Structure and the Budgetary and Financial Control Subsystems are provided in a separate STD Technical Report, TR 0128, titled "STD Management Systems - Task Structure and Budget/Financial Subsystem." That report also contains a discussion of the methodology used for integrating the subsystems for effective decisions and a presentation of the use of linear programming as a budget design technique.

ORGANIZATION STRUCTURE

Organization planning is the management process of translating company or project objectives into functional or task groups of responsibility with associated guidelines for decision-making authority and processes for purposes of effectively directing manpower in the achievement of those objectives. In the design of an organizational structure it is necessary to consider, among others, such primary factors as a product versus functional or alternative structures, and the degree to which decision-making authority is to be decentralized. Within a project-oriented concern, an additional and vital factor is the potential advantage of changing the initial structure and/or the level of decentralization at particular points in time when project activities are being phased from planning to developmental and then later to operational activities. The structure and its planned evolution, however, must be designed in accordance with the primary and subsidiary objectives, the nature of specific tasks, resources, and behavioral characteristics of employees and the environmental forces within which they must operate.

Historical analysis of various organizations reveals that a particular structure may be highly effective for, say, the manufacturing industry, but has proven to be significantly less efficient in achieving the objectives of distribution concern. No generic model exists which can assure management that an optimal structure is being employed to achieve their objectives.

Design Process

The process for designing an organization structure consists of the five steps listed below, each of which is discussed in more detail with comparisons to the STD in the following sections:

1. Establish objectives
2. Identify alternative structures
3. Analyze alternatives and behavioral benefits
4. Select a structure which optimizes benefits
5. Implement the structure

Project Objectives and Functional Requirements

"Objectives" refers to the results which an enterprise must achieve over a specified period of time to be considered successful. For purposes of organization planning, it is desirable to state objectives which will force long-term analysis; i.e., for a period of at least five years for most organizations. The essence of this effort is to increase the probability of a stable and enduring organization.

The STD objectives evolved into those identified in negotiations with its federal funding agencies, the National Institute of Education and the Office of Telecommunications Policy, HEW, and were designed to encompass the last two years of the four-year project. These objectives were:

1. To demonstrate the feasibility of a satellite-based media distribution system for isolated rural populations;
2. To test and evaluate user acceptance and the cost of various delivery modes, using a variety of materials.

Although these particular objectives were not those stated at the initiation of the project by either the STD or federal management, certain observations can be made in terms of the original STD organization structure design and its related analysis below. The above

statement of objectives reveals the primary functions or tasks to be accomplished. Further, the project and federal objectives which existed at the initiation of the project required essentially these same functions, differing primarily in the emphasis of the subobjectives and functional requirements, but not in the actual functions to be accomplished. For instance, at the initiation of the project there was greater emphasis on the functional requirement of "content development" than that evident in the objectives stated above. However, the version used here and prevalent STD/federal management perceptions did not eliminate the task of content development, but de-emphasized its relative importance. Therefore, the analysis of the STD organization herein will be based on the stated objectives with reference to evolutionary patterns when appropriate.

As previously noted, the objectives identify the major functional requirements. There is the stated need for development of or access to a "satellite-based media delivery system," i.e., a satellite communications network. There is the stated research effort necessary to "test and evaluate user acceptance" and costs. The usage of a "variety of (programmatic) materials" specifies a task to design and develop or acquire (video) materials of a quality suitable for logical testing and evaluation, i.e., comparative in quality to similar existing programs for specific audiences. Inherent in the objectives is the requirement to effectively implement the communications delivery system and satellite broadcast of materials in such a fashion that they could be accessed and evaluated by isolated rural populations. This implementation effort, supported by previous STD and federal management agreements of such policies as a "user-based" design philosophy, specify the need for a "field support" function. Further, there were known and accepted policies which were not stated, such as the requirement for the materials to be primarily instructional in nature, thereby generating a "content development" activity.

Based on the discussion above, the primary functional areas necessary to accomplish the STD objectives were as follows: Broadcast and Engineering (satellite communications network), Research (test and evaluation), Production (video materials), Content (instructional content development), and Utilization (field support for implementation and audience participation).

The scope of the project, given those functional areas, was still subject to design

activities within each area and to resultant negotiations with federal funding agencies on proposed developmental and operational alternatives. This planning phase was to resolve such issues on alternatives as (1) the design and development of a "new" regional satellite communications control center and uplink terminal versus the possible utilization of "existing" NASA facilities; (2) the acquisition of "existing" video programs versus "new" production; (3) related alternatives of new "dramatic" formats versus emphasis on less-costly live or "talking-face" formats; and (4) the relative emphasis on content development including a specification of the number and nature of instructional areas to be addressed, i.e., Early Childhood, Career Development, and/or Higher Education.

Having established the functional areas, subject to modification with changes in either project objectives or scope, consideration must be given to the most effective structure of these efforts in terms of the variables involved, such as the assets and experience of the model's parent organization, FRMS; the logical grouping of similar tasks into divisions or decision-making units; and external forces within which the project must exist. The following sections present a review of such considerations.

Upon selection of a structure, its implementation requires a detailed identification of the tasks, subtasks and activities which enable the establishment of job descriptions, authority/responsibility definitions, and related performance requirements. Finally, a system of reporting and control for decision-making completes a management process directly related to project objectives, i.e., a Management by Objectives (MBO) system.

Alternative Structures

There are seven organizational structures in which possible alternatives can be grouped. These basic groupings are function, product, location, process, customer, time, and matrix. While the STD can be reviewed in terms of each of these alternatives for a recognition of the optimal structure for both it and future similar efforts, additional consideration must be given to the degree of differentiation among functional units. Differentiation is meant here as the difference in cognitive and emotional orientation and related conflict among managers in different units and the differences in formal structure among units. Following

a discussion of the alternative structures below, the STD will be analyzed in terms of its differentiation and the related methodologies for resolution of conflict which varying levels of unit differentiation and integration exhibit.

Product vs. Functional Structures

Of all the issues facing management in most organizations, one of the most difficult is the question of whether to group activities primarily by product or by function. Should all specialists in a given function, such as specialists in marketing, research, engineering, or production, be grouped under a common manager regardless of differences in products with which they are involved, or should the various functional specialists working on a single product be grouped together under the same superior?

In most program or project organizations, the critical decision of product versus functional structure is not an issue. The project is dedicated to accomplish a specific goal within a short period of time, and it exists within an organization which has functional departments from which required project resources are available. The primary management responsibility is the achievement of integration of the functional tasks, using established departmental resources, in meeting objectives. However, the essential assumption in this approach is that the parent organization in fact has existing functional resources.

The STD was a project of the FRMS, an organization which has no functional areas such as research, engineering, or production. The purpose of the FRMS is directed toward an integrative role at a policy- and problem-oriented level for regional benefits. Its experience in this area was the primary asset from which the STD could benefit. The absence of existing functional resources created a unique problem in the organization of the STD, but one which in fact may exist for certain functions with larger firms. The decision between product versus functional organization could potentially be a reality in this situation. Further, because the STD would have no reliance on the FRMS for major functional resources, an additional and complex consideration existed: whether to subcontract major elements of the work to be accomplished to maximize the use of established resources and experience in other organizations. The STD did in fact pursue this opportunity in several areas.

Primary tasks or functional areas of the STD have been identified above: research, engineering, production, content development, and utilization. If the product-oriented structure were to be utilized, the theoretical approach would be to have a separate department for each one of these functional areas dedicated to a particular product or service. It is apparent that this structure is efficient in most cases for larger companies, particularly those with a great variety of products and markets. In the case of efforts similar to the STD, if there are only a few products which are highly dissimilar and each of which requires extensive commitment of functional resources, this type of structure should be given serious consideration.

The STD products, however, can be either directly identified with each functional area (communications network, research plan, etc.), or can be viewed as actual programs received by the audience (retail consumption). In the former view, the functional areas most naturally become a logical structure. In the latter, an initial consideration would be for separate functional activities dedicated to support each category of programs. In the STD, this latter approach was not appropriate since all programs were to be delivered to the same rural receiving points (common communications system), and in fact there was only one primary product (student television programs). Therefore, the functional structure had significant advantages over a product grouping.

Geographic Structure

Remaining alternative structure considerations do not represent viable comparisons with the STD except in the further clarification of elements within its central functional structure. Geographic grouping, a third alternative, is distinguished by activities carried on in a given locale. Such a grouping permits specializing in local conditions and affords the opportunity for responsiveness to the unique characteristics of a given region. In industry this approach is often evident in service and in selling organizations.

Whereas the primary STD activities were centrally located in Denver, Colorado, the project utilized geographic differentiation where the benefits of localization appeared evident, such as in tasks associated with motivating interest, participation, and audience acceptance

at the state and local levels. This localization was accomplished through State Coordinators physically located in state agencies and through subcontracting with the school sites which actually received television programs (receiving sites) for the services of Site Coordinators. The same rationale and policy was in fact pursued by the federal government in subcontracting with the Federation of Rocky Mountain States, Inc., a regional organization, in the federal management's pursuit of maximizing the benefits of decentralizing decision-making through regional and state participation in the provision of services to their local constituencies.

As would be expected, personnel in the geographic regions become identified with and concerned about their particular region, which is the key purpose of this structure, with the risk being the local personnel's exclusion of concern about the total enterprise. Energy is directed toward making the activities in the region as successful as possible. If conflict arises, it should be as welcome as it is an item of concern, since it reflects the basic intent of this approach. The primary benefit of geographic grouping is responsiveness to those conditions of importance in successfully achieving results. This guidance is as applicable to the federal and regional differentiation as it is to the regional and state or local.

Process Structure

In the fourth or process-type structure, activities are grouped into a series of stages through which work moves. The benefit is that individuals specialize by process, such as in the oil industry stages for exploration, production, refining, and distribution. Within the STD, each functional area moved through a process or sequence of stages that can be categorized as planning, development, and operation. If the project had been designed to exist for a much longer period of time, it may have been advantageous to utilize different groups of personnel for each stage within particular functions. The rationale for this is to capitalize on specialization. For instance, in engineering, the planning and design function often requires significantly different capabilities and personnel interests than operational activities. In this regard, if the operational activity is to endure over a period of years, a

planned replacement of design and development personnel with operationally experienced staff should be accomplished. Further, with longer-range projects, the design personnel might be placed on new applications.

This consideration and analysis is perhaps most appropriate for efforts similar to the STD which are being designed and implemented in foreign developing countries. Their efforts are multi-year activities with planned stages of new design initiation. Parameters for the STD which precluded this planned change in personnel with each successive stage were (1) that the systems and products to be developed by STD personnel were in some cases being applied on a massive scale for the first time, thereby necessitating plans for modifications and improvements during at least the initial portion of each successive stage by the original specialists in design and development; and (2) that the STD was to accomplish all its objectives within a four-year period with only one year of operational activity. While the same critical professional staff, therefore, was retained through each stage, the STD management had to remain cognizant of the inherent problems of specialization and interests through changing phases. These concerns were alleviated with consultants, special training courses, and through subcontracting for certain developmental and installation or operational tasks.

Market Structure

A fifth alternative structure is based on the customer or market served. Personnel specialize in the customer, becoming knowledgeable about their needs and peculiarities. The primary benefit is appropriate responsiveness to these characteristics. Within the STD, this grouping was clearly evident in the specialization required in content development for different audiences or users.

Prior to a reduction in the scope of the project, the primary STD audiences included both junior high school students and early childhood caretakers. With these differentiated users, it was neither efficient nor effective to utilize the same content development staff to accomplish the design of the instructional objectives and related programs (products) for both audiences (customers). The cause for potential ineffectiveness is the specialization in knowledge of the two audiences by development staff. However, even though content development required differentiation by audience-type in the STD, it did not impact on other

functions; i.e., the early childhood unit did not require its own communications network or video production staff.

Future efforts should analyze each functional area to ensure that differentiation by audience or customer for a particular function(s) improves effectiveness of the product and/or efficiency in the entire effort. For instance, the STD had also pursued differentiation by content area (customer) in certain aspects of the field support function at the state and local level. State Coordinators had been augmented with two content liaison personnel, one representing each audience. Because the project eliminated the early childhood area and budget restrictions did not allow for continued use of a Career Education liaison, the contribution of this approach cannot be assessed. The criteria, however, for its use should be based on the relative contributions such liaisons provide because of their knowledge of a particular audience and/or the amount of manpower required to accomplish such tasks as user organization, motivation, and participation for each audience.

Structure by Time Period

Grouping by time is a sixth alternative which does not alter any given primary structure. This is utilized to maximize the usage of such resources as equipment facilities with day and night shifts, but does not affect, for instance, the primary function of production. The STD utilized this technique, as many organizations do, in achieving production results required within a stringent schedule where sufficient personnel and equipment resources allowed. Specifically, the video program editing activity was accomplished by a minimum night shift staff during certain periods of the schedule so that more efficient use of the studio facility could be achieved each day by a full production crew complement (actors, cameramen, content specialists, directors, etc.).

Matrix Structure

Matrix structures, the seventh alternative, include various types of groupings, such as the typical program or project organization which acts as in integrative task force team to access required resources (personnel specialists, facilities) from an existing organization's functional departments. The relation of the STD to this normal project structure has been

discussed above in consideration of product versus functional differentiations. The STD employed interim inter-component use of similar structures, such as task force teams composed of individuals from each functional component. These teams addressed issues and problems which required knowledge from two or more areas, and existed only during the time required to sufficiently address their obligation.

Analysis of Alternative Structures and Behavioral Benefits

The selection of a particular structure should be based on an analysis of the benefits which may accrue from the alternatives. As indicated above, a decision should not preclude further analysis of the use of other structures at various levels throughout the organization.

While several categories of factors which can affect benefits will be reviewed here for an analysis of alternatives, it should be recognized that an initial determination must be made about specifically whom it is intended to benefit. It is assumed that the primary benefactor is to be management in the achievement of stated objectives.

Because of the critical effects on possible benefits, since essential work must be accomplished, specialization is usually given initial consideration in the design of an organization. The criteria is not whether specialization is desirable, but what type affords maximum benefits. Each alternative structure discussed above represents a type of specialization--product, function, geography, process, customer, time, existing resources (matrix).

Advantages to specialization are evident: personnel concentration, reduced training time, minimization of an employee's required range of abilities or knowledge, focusing of energy and enthusiasm, a potential increase in motivation by an employee who can readily complete a task, easier work measurements, and existing specialized resources. Disadvantages also accompany specialization: costs may increase and securing an integrated effort is likely to be more difficult.

Recognizing the essential benefits which would accrue from specialization, the STD employed the technique in such ways as subcontracting a major functional effort, early childhood content development, with another organization which had extensive experience in that area. The same subcontracting approach was utilized in several other areas such as frequency

clearances, manufacturing and installation of the Denver Uplink facility, and in the manufacture of specialized STD-designed electronic equipment. The STD also pursued subcontracting of the entire television production activity to achieve the significant benefits of existing facilities and regional production experience. It became necessary, however, to utilize a median in-house studio facility when funding limitations prohibited the more costly external production subcontracting.

Other factors which should be considered in assessing benefits of different structures are (1) the fact that one structure may facilitate easier control over results than another; (2) that coordination among units may be achieved with more ease and more effectively with, say, a product versus a functional structure (this is usually true since it requires less time for a manager to coordinate activities on a product speciality than the functional manager who has limited time to dedicate toward all products); (3) the assurance that a given structure motivates managers to give adequate attention to major objectives (functional structures offer this advantage over most others); and (4) that the relative effect on costs of alternative structures may be decisive.

With regard to designing a structure which ensures that adequate manager attention is given to primary tasks, the use of a "staff" (versus line) group for particular efforts may be advantageous. In such cases, the greater the emphasis top management places on the activity, the higher in the organization the staff group should report. The STD management utilized this approach in achieving dedicated attention to the Public Information (PI) effort. Instead of delegating this activity to one or more functional areas, the Public Information Office reported to the Project Director.

Selection and Implementation of a Structure

The selection of an organization structure should be based on the optimal benefits to be derived. Its implementation will involve a definition of the goals of each grouping, whether functional, product, or geographic. These goals can then be used to define specific tasks, responsibilities, and lines of authority from which job descriptions and performance measures can be established. Individuals' efforts should then be relatable to specific objectives of activities for which they are responsible and measurable, and in a larger sense

to the overall intent of the organization. The STD utilized this approach in varying degrees, supplemented with a budgetary and financial control subsystem.

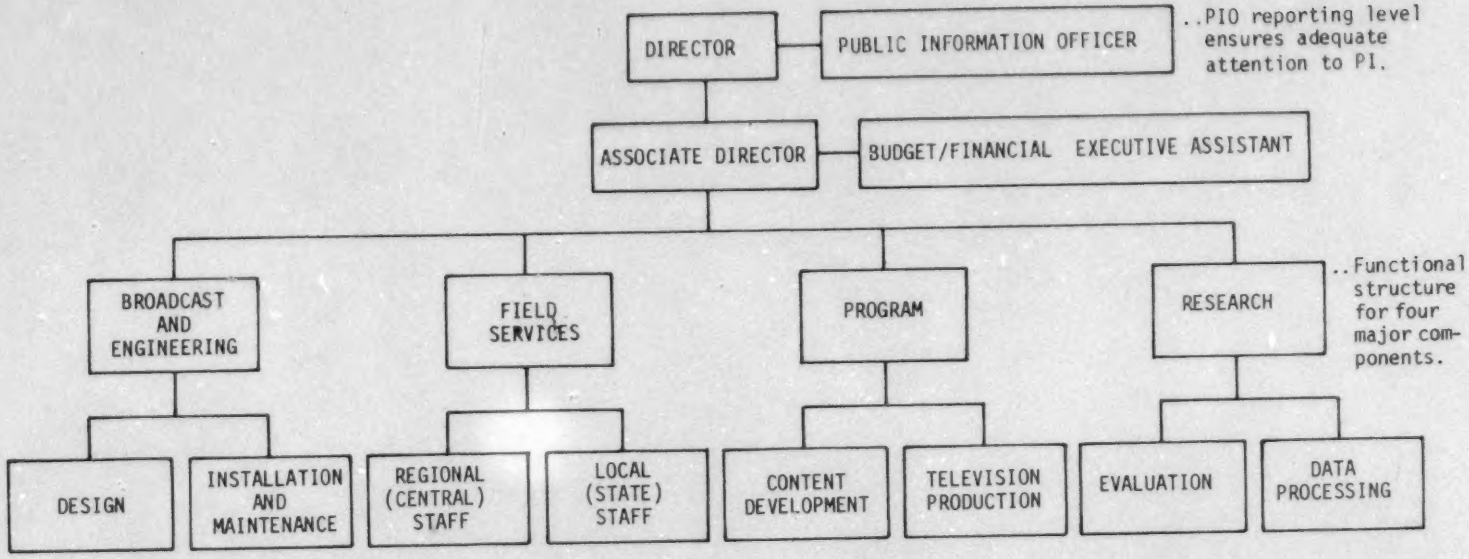
As previously referenced, organization structures and related differentiation of working groups can cause conflict. The various functional units will require some level of integration or coordination. Jay Lorsch identifies a specific characteristic of units which may contribute to conflict: (Lorsch, 9)

> When persons have to work together but have different views about the problem - which is what the concept of differentiation is all about - they are going to have a conflict. In essence, what we found was that organizations, to be economically successful, needed to meet environmental demands for both differentiation and integration, but they had to do this in spite of the fact that these two states were opposed to each other. The more different two highly independent units were, the more difficult it was for their members to communicate with the understanding necessary to achieve satisfactory integration.

The STD, being composed of functional areas which were in fact significantly different disciplines (human behavior-field support, engineering, television production, education), recognized the possibility of conflict and encouraged it for specific activities. The opportunity for innovation in design and development and for a necessary exchange of ideas often requires this element. In less productive areas of conflict, Lorsch references possible solutions: (Lorsch, 12)

> First (is) the confrontation of conflict. In the effective organization, rather than smoothing over differences or using power to win a point, the managers openly discussed their differences and worked until a sound solution was found. Second, the pattern of influence or power, both among units and up and down the hierarchy, was found to be important. In essence, in the effective organization, the real decision-making influence was concentrated in those units and at those levels where the knowledge about the factors affecting decisions was also located. Third, in those organizations employing special integrative (staff) roles, it was found that these integraters needed to have a balanced orientation and viewpoint between the extremes of the units they were linking.

The STD organization structure selected and utilized during the last two years of the four-year project was based on a functional differentiation of primary tasks and related products/services which were required to achieve a general set of objectives. The required functional tasks, therefore, were identifiable with four distinct disciplines which became the four major divisions or components of the STD. The components were: Broadcast and Engineering; Program, which included content development and video production; Field Services; and Research.



ENGINEERING

..Specialization by subcontracting manufacturing.

MARKETING

..Geographic structure used - local staff.
..Customer-oriented structure also used with local staff.

PRODUCTION

..Structure by time period also used.
..Specialization by subcontracting content development.

RESEARCH

..Task Force Teams used across components.
..Specialization by use of National Advisory Board (consultants).

Figure I. STD Functional Organization Structure

In addition to the four components, an administrative function was responsible for overall project policy and management, funding negotiations, budget design and financial control, relations with other satellite experimenters and agencies within or relevant to the entire demonstration, and for public information activities. Figure I, on the preceding page, depicts the organization structure as defined above and also provides reference to the alternative structures used at different levels.

During the first two years of the project, the organization structure was modified to accommodate for changes in the nature of tasks being accomplished and to effect an equitable differentiation of component responsibilities. During this initial planning and design phase, for instance, Content Development was given equal emphasis to that of other areas and existed as an independent component. A merger of Content Development with Production into a new component, "Program," was accomplished because (1) the major efforts in content design, such as the identification of an audience and an initial definition of instructional objectives, had been accomplished; and (2) through a formal negotiation with the project funding agency, an agreement was reached to reduce the emphasis on content development. Another change was to establish a specific component for all research and data processing activities. The reason for this was to (1) provide a distinct responsibility and emphasis for the primary task of designing, implementing, and documenting a formal research plan and (2) to ensure that those tasks and responsibilities received consideration in resource allocations and control at least equal to that of other components. Prior to this time, the research and data processing activities were staff functions in Administration. Although such a staff capacity is normal for research efforts in many organizations, the STD objectives and funding agency priorities gave this area a decidedly different emphasis.

Earlier, and perhaps less significant, modifications to the organization structure included a separation of the Production responsibilities from the Broadcast and Engineering component. This change allowed for a more equitable allocation of responsibilities across all components, and more importantly, clearly separated two disciplines into areas of responsibility which could be more effectively monitored and coordinated.

MANAGEMENT SYSTEM

The management of an enterprise can be defined as the process of making decisions to maximize the utilization of resources in efforts to achieve a predetermined set of objectives. In this decision-making capacity, management is involved in the planning, organization, direction, and control of all available resources. The STD designed a management by objectives (MBO) system to achieve the general objectives agreed upon through negotiation with its federal funding agency.

Subsystems

The STD system consisted of the following three subsystems, all of which are discussed in detail in the STD Technical Report TR 0128 referenced above:

(1) A set of tasks, subtasks, and more detailed activities with specific responsible persons, intercomponent and intertask dependency relationships, and milestone schedules. This task design, in accordance with the ideal MBO approach, was directly related to the primary products and services identifiable from the more general statement of project objectives, i.e., it was designed to allow for the monitoring of progress on specific objectives or tasks which related to an overall project purpose.

(2) A budgetary and financial control system which allowed for the monitoring of costs and exceptions by component, selected subtasks, and project-generic account codes. The cost control system, in conjunction with the Task Network, was a modified PERT-COST network since the costs were monitored for a selected subset of all subtasks.

(3) A formal system of management meetings and reports designed to integrate the reports from the Task subsystem and the Financial Control subsystem defined in (1) and (2) above for effective resource allocation and control decisions.

Task Forces and Consultants

In addition to the subsystems described in general above, the organization and management of certain tasks were accomplished by various specifically designed task forces of small groups of individuals from two or more components. Those task forces existed for short

periods of time to address particular problems or tasks which were either (1) not naturally assignable to any particular component or (2) required a concentrated effort by at least one or more persons from several components.

SUMMARY

The characteristics projected for organizations of the future indicate that program or project management will become a frequently used device. The design of a project organization is frequently related to the characteristics of the organization in which it is used. This report reviews a project organization model, the Satellite Technology Demonstration, a project of the Federation of Rocky Mountain States, Inc., as it relates to a theoretical approach to the design of an organization and management system. In general, the design process involves steps to (1) establish objectives; (2) identify alternative structures; (3) analyze alternatives and behavioral benefits; (4) select a structure which optimizes benefits; and (5) implement the structure. The decision for a particular type of structure should not preclude further analysis of the use of other structures at various levels throughout the organization. The benefits of specialization by subcontracting, use of staff versus line functions, geographic location of staff, and structuring by time period can be effectively achieved within another primary structure by, say, function or product.

The design of a management system for a project should be directed toward relating the overall project objectives to the activities for which each employee can be responsible and measurable. This can be accomplished by defining successively more detailed statements of tasks, starting with project objectives. The process is a management by objectives (MBO) approach.

The STD utilized a functional organization structure with alternative structures at different management levels. The management system consisted of a modified MBO task structure and a budget/financial control subsystem, both integrated with a formal reporting and decision-making process.

REFERENCES

Bennis, Warren G. Changing Organizations (New York: McGraw-Hill Book Co., 1966)

Lokey, Kenneth R. Unpublished Technical Report TR 0128, STD Management System; Task Structure and Budget/Financial Subsystems (Denver, Colorado: Satellite Technology Demonstration; Federation of Rocky Mountain States, Inc., 1975)

Lorsch, Jay W. and Paul R. Lawrence. Studies in Organization Design (Homewood, Illinois: Richard D. Irwin, Inc., 1970)

March, James and Herbert Simon. Organization (New York: John Wiley & Sons, Inc., 1958)

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